



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,092	01/23/2004	James Mitchell Tour	122302.00012	8256
22428	7590	04/06/2006	EXAMINER	
FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			LEUNG, PHILIP H	
			ART UNIT	PAPER NUMBER
			3742	

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/764,092

Applicant(s)

TOUR ET AL.

Examiner

Philip H. Leung

Art Unit

3742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 12-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 6-21-04 & 8-23-04
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Applicant's election without traverse of Group I, claims 1-11 in the reply filed on 1-13-2006 is acknowledged.

2. Claims 12-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1-13-2006.

3. The drawings filed 5-27-2004 are acceptable.

4. Claims 1-11 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 62-108 of copending Application No. 10/846,045. Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are directed to a method of generating light by subjecting nanotubes to microwave radiation. The claims in this application are generic to the claims in the copending application and are much broader in scope.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

Art Unit: 3742

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. In view of the similarity and overlapping of the claims in this application and the copending application Serial No. 10/846,045 for the reasons set forth above, applicant is respectfully reminded that a clear line of demarcation must be maintained between these two applications.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (KR2002-0046342).

The broadly worded claims include only a single step of “exposing carbon nanotubes to microwave irradiation. The limitation “causing light emission” in claim 1, “causing mechanical motion” in claim 2, “causing reconstruction” in claim 3 and “outgassing absorbed or adsorbed species” in claim 4 are inherent functions and results in Lee as it shows an EM radiation source with a desired power setting and frequency (electromagnetic wave irradiation device) for

Art Unit: 3742

exposing the carbon nanotube to the EM radiation source for a predetermined duration (see Figures 1-4 and the English abstract).

9. Claims 1-4, 6 and 7 are further rejected under 35 U.S.C. 102(b) as being anticipated by Hjorstad et al (US 2002/0183207) (cited by the applicant).

Again, the broadly worded claims include only a single step of “exposing carbon nanotubes to microwave irradiation. The limitation “causing light emission” in claim 1, “causing mechanical motion” in claim 2, “causing reconstruction” in claim 3 and “outgassing absorbed or adsorbed species” in claim 4 are inherent functions and results in Hjorstad as it shows exposing carbon nanotubes (paragraph [0037]) to microwave source the microwave radiation source as it states in paragraph [0031]:

By using electromagnetic radiation, such as microwaves or light to irradiate nanostructures, excited electrons are produced. The electrons in the valence band of semiconducting nanostructures absorb electromagnetic radiation and cross the bandgap to the conduction band, which leads to an enhanced conductivity. In semiconducting nanostructures absorption can only take place if the irradiating energy is greater than the bandgap energy.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 5, 8 and 9-11 are rejected under 35 U.S.C. 103(a) as being obvious over Hjorstam et al (US 2002/0183207), in view of Sklyarevich et al (US 6,423,605) (cited by the applicant) or Zhang et al (US 6,203,864).

As set forth above, Hjorstam shows very feature as claimed except for the explicit showing that the carbon nanotubes are subjected to microwave radiation while in an inert gas chamber or a vacuum chamber. However, Sklyarevich teaches cooling the processed material with a cooled gas that did not have any influence on the activation process to reduce diffusion (page 6, lines 63-67). As to wherein the carbon nanotubes are subjected to microwave radiation while in a vacuum chamber, Sklyarevich teaches a vacuum chamber 10 (col. 5, lines 45-49; and Fig. 2). Similarly Zhang shows irradiating carbon nanotubes with electromagnetic wave in a high vacuum chamber or in an argon or a nitrogen (inactive gas) atmosphere (see the abstract, col. 4, line 8 – col. 5, line 12). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Hjortstam with wherein the carbon nanotubes are subjected to microwave radiation while in a vacuum chamber or in an inert gas chamber because this would have cooled the processed material with a cooled gas that did not have any influence on the activation process to reduce diffusion, in view of the

Art Unit: 3742

teaching of Sklyarevich or Zhang. As to wherein the vacuum is between approximately  $10^{-4}$  torr and  $10^{-8}$  torr and the microwave frequency is between 0.1 GHz and 100 GHz, Sklyarevich teaches that a person of ordinary skill in the art can easily modify the installation for manufacturing processes of various scales (col. 5, lines 65-67; and Fig. 2). Thus, the vacuum and microwave frequency are result effective variables which one of ordinary skill in the art can determine to carry out the desired reaction. Furthermore, the claimed microwave frequency range is the industrial standard and the vacuum degree is similarly shown in Zhang (see col. 4, lines 43-47).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip H Leung whose telephone number is (571) 272-4782.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on (571) 472-4777. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Philip H Leung  
Primary Examiner  
Art Unit 3742

P.Leung/pl  
4-3-2006